DOI:
10.1016/j.healthpol.2014.07.005

Document Version
Publisher's PDF, also known as Version of record

Health Policy 117 (2014) 382–391

Contents lists available at ScienceDirect

Health Policy

journal homepage: www.elsevier.com/locate/healthpol

The international spread of Academic Health Science Centres: A scoping review and the case of policy transfer to England

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ARTICLE INFO

Article history:
Received 17 March 2014
Accepted 2 July 2014

Keywords:
Academic Health Science Centre
Translational Research
Scoping Review
Policy Transfer
England

ABSTRACT

Academic Health Science Centres (AHSCs) have been a key feature of the North American healthcare landscape for many years, and the term is becoming more widely used internationally. The defining feature of these complex organisations is a tripartite mission of delivering high quality research, medical education and clinical care. The biomedical innovations developed in AHSCs are often well documented, but less is known about the policy and organisational processes which enable the translation of research into patient care.

This paper has two linked purposes. Firstly, we present a scoping review of the literature which explores the managerial, political and cultural perspectives of AHSCs. The literature is largely normative with little social science theory underpinning commentary and descriptive case studies. Secondly, we contribute to addressing this gap by applying a policy transfer framework to the English case to examine how AHSC policy has spread internationally. We conclude by suggesting a research agenda on AHSCs using the relevant literatures of policy transfer, professional/managerial relations and boundary theory, and highlighting three key messages for policy makers: (1) competing policy incentives for AHSCs should be minimised; (2) no single AHSC model will fit all settings; (3) AHSC networks operate internationally and this should be encouraged.

1. Introduction

Academic Health Science Centres (AHSCs) have been a key feature of the North American healthcare and university landscape for several decades. The term AHSC (or variants of it) is now becoming more widely used internationally, for example in the Netherlands [1,2], Australia [3] and the United Kingdom [4,5]. The defining feature of these complex organisations is a commitment to pursuing a tripartite mission of (1) achieving high standards of clinical care, (2) leading clinical and laboratory research and (3) educating doctors and other health professionals.

As governments have become increasingly interested in developing policy initiatives which encourage the translation of research into practical use for populations, AHSCs have become important organisations in many healthcare systems. Their multiple missions are considered vital for the health and wellbeing of wider society, and they are large recipients of public monies [6,7]. The biomedical innovations developed in AHSCs are often widely disseminated through the research community, but less is known about how these organisations work to achieve their three missions, or how they try to overcome traditional boundaries to translate research into patient care.

When AHSCs are less successful at achieving their missions, this may not be because of the science, or even funding issues, but due to competing policy pressures, or social and organisational structures and interactions [8,9].

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http://dx.doi.org/10.1016/j.healthpol.2014.07.005

By demonstrating how these factors hinder or enable particular scientific discoveries to be translated into patient care, or how organisational structures can help or hinder knowledge sharing, the social sciences can make an important contribution to the AHSC mission.

This paper has two linked purposes. Firstly, we present a scoping review of the literature on AHSCs as organisations, as distinct from the study of university or healthcare delivery settings. In particular, we critically assess the work that explores the managerial, institutional, political and cultural perspectives of AHSCs. We aim to provide a wide survey of the subject area, highlight key papers in the field, identify gaps, and draw out key themes and messages for researchers and policy makers.

We identify that the AHSC literature is largely atheoretical and heavily dominated by single case study reports from North America. Therefore, the second purpose of this article is to provide a further contribution to the literature by taking a policy oriented approach. We do this by considering how and why the moniker AHSCs has spread in recent years, by using a policy transfer framework and considering the case example of England. We discuss key themes from both the findings of our scoping review and the case example to outline a potential research agenda for AHSCs and conclude by drawing out policy implications.

2. Definitions and missions of AHSCs

There is no universally agreed definition of an Academic Health Science Centre. Some view the essential components of an AHSC as a medical school, its associated hospitals and clinical facilities and other health professional schools [10]. Others argue that few definitions adequately represent the scope and varied needs of these complex organisations, which differ both within countries and internationally [11]. The structure and composition of each AHSC is different and determined by a variety of factors, causing many to comment "when you have seen one Academic Health Centre, you've seen one Academic Health Centre" [12].

Given this structural complexity, it may be more appropriate to define AHSCs by the missions they pursue rather than their organisational models. It is generally accepted that the core missions of AHSCs in all settings are to deliver high quality basic and clinical research, education to health professionals and clinical care to patients. These multiple missions ensure that the governance and financing of AHSCs are also complex [13].

Furthermore, an increasing policy focus on translational research highlights AHSCs as appropriate vehicles through which to deliver research from the "bench to the bedside" [14]. Translational research is traditionally characterised as a linear process which takes findings from basic research and delivers them as innovations in clinical practice, overcoming gaps along the way [15]. This conceptualisation does not consider how behavioural processes may influence implementation, allow local interpretation of results or enable only superficial adoption of findings [16]. A social science lens, which considers the complexities of delivering translational research and other missions in AHSCs, may provide a useful insight into these multifaceted organisations and their policy drivers.

3. Methods

We outline our methods used for (1) the scoping review and (2) the case example below.

3.1. Scoping review

As we aimed to provide a wide survey of the body of work on AHSCs and a critical analysis to identify gaps, we undertook a scoping review of the literature [17–19]. This approach enabled us to identify, examine and summarise the diverse literature on AHSCs, which contains a variety of contributions, and highlight key themes. We also provide some quantitative analysis to give an overview of the current literature.

3.1.1. Search strategy

A bibliographic search was conducted of English language publications, up to July 2012, using ISI Web of Knowledge, Scopus and Business Source Premier databases. These search engines were selected as they encompass a wide range of scientific, health and social science journals. No date limit was placed on the searches. The search was conducted using "Academic Health Cent*" OR "Academic Medical Cent*" OR "Academic Health Science* Cent*" in the title of the publication. In addition, a hand search of selected management and health policy journals and books was performed.

The inclusion criteria for the review were publications that considered the managerial, institutional, political or cultural aspects of AHSCs and their tripartite missions. Articles which related to a specific clinical or service issue within AHSCs without broader reference to the organisation were excluded. The methodology of the publications was not part of the inclusion or exclusion criteria. For example, personal reflections of individual cases and events, although potentially biased, are a large part of the AHSC literature and so were included in this review.

The database search produced 3510 results, which we reviewed by the title of the publication in accordance with the inclusion and exclusion criteria (see Fig. 1). Of these, 599 publications were then reviewed by abstract or full text, and 372 publications were included in the final selection. The dominant themes and subject matter in the texts were extracted using an open analysis, to enable a wide range of themes to be drawn from the data [20]. A sample of 100 publications was reviewed and discussed by all three authors to determine reliability of the inclusion and exclusion criteria and to develop the key themes. The included literature was then coded for country of origin, type of journal, year of publication, type of publication, the main theme it addressed and any key recommendations.

3.2. Case example

The case example is part of a wider study on two AHSCs in England. It was informed by an analysis of English policy documents between 1996 and 2012, together with

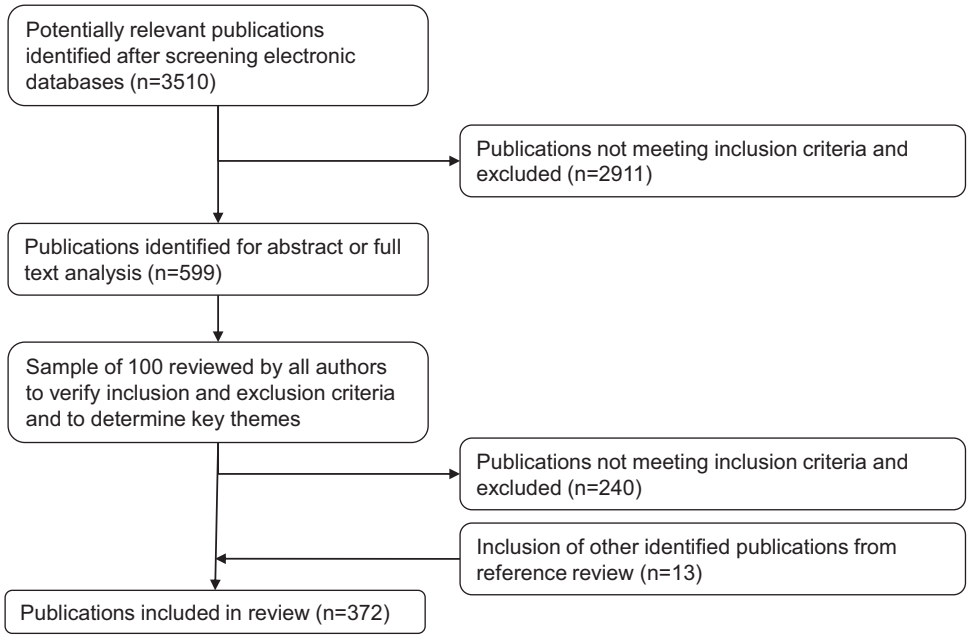

Fig. 1. Flow diagram of publication selection process.

strategic organisational documents from English AHSCs between 2007 and 2012.

4. Results

4.1. Scoping review

4.1.1. Type of literature

The majority of publications were from North America reflecting the historical use of the term AHSC in these countries to describe a hospital and university partnership. The earliest publication included in the review was published in 1969 [21]. Articles from 141 different journals were included in the review, with 28% of total publications reviewed appearing in the Journal of the Association of American Medical Colleges (now Academic Medicine). The key findings are summarised in Tables 1–4. The four key themes identified are examined in more detail below, with key policy considerations outlined.

4.1.2. Theme 1: AHSC responses to external challenges

The volume of publications on AHSCs published at any one time mirrors the perceived external challenges faced by the organisations at various points in history. For example, there was an increase in the number of papers in the mid to late 1990s, when AHSCs were facing unprecedented financial challenges as a result of US healthcare market reform [13,22,23]. This was due to a reduction in the public funding of research and education, together with an increasing number of managed care patients which forced expensive AHSCs to compete with cheaper non-academic hospitals, often for payments below cost [33]. Similar challenges were faced by Canadian AHSCs [11,34].

The literature includes a number of personal and organisational case study accounts of AHSC responses to these and other challenges [13]. The key documented responses of AHSCs include:

1. **Merger** (and often subsequent **de-merger**) of whole or part AHSCs, such as UCSF/Stanford [24].
2. **Restructuring** the organisations to create clearer governance structures such as creating physician-hospital organisations [35].
3. Forming external **partnerships** with organisations such as Health Maintenance Organisations [36].

Table 1
Breakdown of publications reviewed by country of study ($N = 372$).

Country of study	Number of publications
United States	322 (86.6%)
Canada	29 (7.8%)
United Kingdom	12 (3.2%)
Australia	4 (1.1%)
Cross country comparison	2 (0.5%)
The Netherlands	2 (0.5%)
South Africa	1 (0.3%)

Table 2
Breakdown of publications reviewed by type of journal ($N = 372$).

Type of journal	Number of publications
Clinical	155 (41.7%)
AHSC Leaders and Policy Makers	130 (34.9%)
Health Policy/Management	72 (19.4%)
Basic Science	8 (2.2%)
Information Technology	3 (0.8%)
Research Policy	2 (0.5%)
General Management	1 (0.3%)
Law	1 (0.3%)

Table 3
Types of publications reviewed ($N = 372$).

Type of publication	Number of publications	Examples
General commentary or opinion	190 (51.1%)	Iglehart [22,23]
Case study of one or more AHSCs	93 (25.0%)	Kastor [8,9]
Conceptual framework or theory development	28 (7.5%)	Kitchener [24]
Report of survey	21 (5.6%)	Souba et al. [25]
Literature review	4 (1.1%)	Topping et al. [26]
Other (e.g. financial analysis)	36 (9.7%)	Koenig et al. [27]

Table 4
Main themes of publications reviewed ($N = 372$).

Main themes	Number of publications	Examples
How AHSCs respond to the external environments in which they operate	182 (48.9%)	Blumenthal and Meyer [13]
The missions of AHSCs and the tensions between them	92 (24.7%)	Task Force on Academic Health Centres [28–30]
How AHSCs are structured	56 (15.1%)	Weiner et al. [31]
The organisational and managerial challenges of AHSCs	42 (11.3%)	Guo [32]

This theme is summarised in a review focussing on the changing environment facing AHSCs and their strategic responses [37].

4.1.3. Theme 2: the many missions of AHSCs

The second, related theme in the literature is the role of AHSCs in the wider health economy and the three core missions they set out to achieve. Again, most of the papers in this theme are descriptive case studies or commentaries, and range from those that reflect on the importance of AHSCs as leaders in their healthcare system, particularly in Canada and the USA [38], to those that describe how AHSCs may work towards each individual mission (research, education and patient care) [39,40], and those that highlight the tensions between the missions [28–30].

A fourth mission identified in the North American literature is the "social mission" of AHSCs of caring for uninsured communities in their localities. Some commentators call for AHSCs to have a stronger emphasis on primary care and community needs [41], whereas others feel that AHSCs should concentrate on high end tertiary care and research [42].

The fifth mission of AHSCs identified in the literature is translational research. AHSCs are seen as centres for the delivery of research from "bench to bedside" due to their joint missions of high quality research and healthcare delivery. Two papers usefully describe obstacles (and potential solutions) to the delivery of translational research in the AHSC setting [14,43].

The tensions between the missions are highlighted by several authors, who describe pressures stemming from a variety of external requirements [44] as well as internal governance and power dynamics between individuals, such as the roles of the medical school Dean and the Chief Executive of the hospital. Essentially these tensions stem from the need to achieve academic success whilst maintaining financial solvency by maximising the number of patients through clinical facilities [45]. Authors call for policy makers to recognise this complexity and to ensure that competing policy incentives are minimised.

4.1.4. Theme 3: structure of AHSCs

Mission tensions and organisational complexity are highlighted further in studies on the structures and governance of AHSCs. Several papers use conceptual frameworks and descriptive case studies to consider how to optimally arrange AHSCs. There is a range of AHSC structures characterised by the extent to which the academic and clinical missions operate under a single administrative and governance framework [46], and no "one size fits all" model.

All AHSCs lie on a continuum with at one end a model of full structural integration where all the collective components are led by a single Chief Executive Officer and a common overarching board. At the other end is a more loosely affiliated model in which the university academic activities, medical school physician practices and teaching hospital operations are each managed by different leaders and governed by different boards [46]. Under this model, integration is more functional than structural with the different parts of the AHSC remaining distinct legal entities but sharing strategic planning.

This conceptual framework is developed by several authors who outline detailed typologies of relationships between medical schools and the "clinical enterprise". For example, one US paper offers eight organisational models to medical school leaders and provides guidance on the benefits and drawbacks of each in managing relationships between physicians, hospitals and other parts of clinical delivery [31]. This model is also applied to the Dutch academic health system with the conclusion that although adaption to a different national context is required, many of the challenges faced by AHSCs cross national boundaries, and therefore a more theoretically informed study of AHSCs would be a "rich seam of inquiry" [1].

Many more papers describe detailed case studies of the structures of individual or pairs of AHSCs, and how these have adapted and changed over time, for example Pizzo [47]. Barrett [46] charts the history of the varying structure of the University of Florida AHSC, which was created in the 1950s as a fully integrated AHSC and which now operates under a more distributed management and

governance model. Some international case study comparisons have also been made, most frequently comparing US and UK models [48,49]. In summary, one of the main lessons from this literature is that the type of model existing at a given institution reflects a combination of history, politics and economics [50].

4.1.5. Theme 4: "herding cats": management challenges

The final related theme highlights the management challenges for leaders of AHSCs, which Blumenthal [10] likens to "herding cats". Papers highlight the difficulties associated with managing a variety of accomplished professionals, each with their individual and professional values, performance frameworks and external drivers. Again, many of the papers reflecting this theme are commentaries or descriptive case studies, but there are a few theoretically important papers.

For example, Kitchener [24] explores the management challenges of the failed merger of two AHSCs using an institutional approach. We return to this paper in the discussion section. In another example, Guo [32] draws on Mintzberg's typology of work roles to describe the roles (liaison, monitor, entrepreneur, resource allocator) managers undertake at AHSCs, arguing that their input is vital in a competitive managed care environment.

The case study literature provides examples of personal challenges faced by leaders in AHSCs [51]. Souba et al. [25] survey leaders in AHSCs and suggest that closer alliances between deans and surgery chairs may lead to a better performing AHSC. Some cases also provide examples of how performance management frameworks have been implemented at AHSCs, although they tend to only describe where this has been successful [52]. Kastor's accounts of the "turmoil at Penn and Hopkins" and other AHSCs also reflect on the difficulties of management within an AHSC setting [8,9].

4.1.6. Summary of scoping review findings

This scoping review presents a broad overview of the literature published on AHSCs over the last 40 years. Most of the papers on AHSCs are commentaries or descriptive case studies in North American settings. These papers do not attempt to contribute to social science theory, but they do provide rich descriptions of many of the issues, tensions and problems in AHSCs, which can both inform further research areas and provide some practical guidance to managers and policy makers. Those papers that do contribute theoretically, such as Kitchener [24] and Weiner et al. [31], focus mostly on organisational structures or typologies.

Therefore, despite many descriptions of the complex issues within AHSCs, a major gap in the literature relates to the academic study of social and organisational processes within and between AHSCs. There is a lack of theoretical understanding of the agency of people, teams and communities in AHSCs and how they work towards their missions, and also how and why AHSCs are developing internationally.

4.2. Policy transfer and the English case

4.2.1. International spread of AHSCs

Although the AHSC term has also been used outside North America [1,49,3] in recent years, there is very little literature on the organisations in these countries, and on why and how the policy, concept or moniker of "academic health" has recently spread internationally and what implications this has for policy making, translational research and education in the countries that have adopted it. We therefore suggest using the policy transfer literature to explore the contextual factors that may enable or hamper this spread.

Policy transfer can be used to describe and analyse to what extent, how and why policies are transferred between different states and political contexts [53–55]. Dolowitz and Marsh [53] suggest a series of questions as a framework through which to analyse the process of policy transfer. These questions are: what was transferred? Who transfers policy? What factors constrain or facilitate policy transfer? What degree of transfer occurred? Why is policy transferred? We will briefly consider the first three of these questions in relation to the development of AHSCs in England to highlight some key features of AHSCs, demonstrate how AHSCs can be studied and what the implications may be for policy development.

4.2.2. AHSCs in England

Although the concept had been raised before [56], AHSCs really entered the policy lexicon in England with the launch of the Imperial AHSC in 2007. The merger of two acute NHS hospital trusts in London formed Imperial College Healthcare NHS Trust, which then "integrated" with Imperial College London, creating the first self-pronounced AHSC in England. The leadership for the two organisations was brought together through the appointment of one person as both Principal of the Faculty of Medicine and Chief Executive of the NHS Trust. Ideas were overtly drawn from North American models [4].

The moniker AHSCs was then adopted at a national level following a review of the English National Health Service led by an eminent academic surgeon. In this review, it was noted that "we [the government] intend to foster Academic Health Science Centres to bring together a small number of health and academic partners to focus on world-class research, teaching and patient care" [57, p. 57]. In March 2009, five partnerships were accredited as AHSCs following consideration by an "international panel of experts". A further accreditation process took place in 2013 when one further AHSC was added to the original five. The original designated AHSC partnerships consisted of a university with a medical school, linking with a number of NHS organisations, ranging from four to seven. Despite the top down designation process, it was acknowledged that there would be range of different organisations, in common with other countries, reflecting local contexts. The models ranged from the integrated model of Imperial where the university partnered with one large NHS hospital Trust, through to looser partnerships, such as Manchester, where the university partnered with seven NHS organisations, including hospitals, commissioning bodies and

mental health providers. This spectrum of organisational structures mirrors that of North America as outlined in theme three of our review [49]. Despite a variety of governance structures, all English AHSCs have attempted some form of meso (organisational) level integration of clinical and academic departments. This is through either a range of programmes, such as those at UCL Partners, or the development of quasi business units, such as Clinical Academic Groups at King's Health Partners. Whatever the model, a common feature of these programmes or business units is leadership by a senior clinical academic.

What was transferred? This relates to the name, prestige and underpinning missions of AHSCs. The AHSC label is a portmanteau concept flexible enough to be applied to a number of different settings, further reflecting the heterogeneity of AHSCs globally. The partnerships designated as AHSCs were not new. Relationships between organisations, particularly those with fewer partners, were generally pre-existing through links between medical schools and large teaching hospitals. AHSC accreditation did not bring any direct additional funding to these partnerships. Instead, AHSC accreditation was expected to promote strategic alignment of medical schools and NHS partners, enhance the prestige of these organisations, protect current education and research funding streams, attract new research and health care innovation funding and attract high quality staff [49]. Policymakers also explicitly stated that AHSCs were intended to compete globally with other centres [57], reflecting the fact that biomedical research is seen as a key driver in the UK economy [58].

Who transfers policy? Although policy transfer may occur through a number of different networks, often it is politicians and civil servants who "import" ideas from other settings [55]. In the AHSC setting, the policy network also consisted of academic elites from within English universities and the health sector. In this policy network, "academic elites" are part of an epistemic community where people and ideas can cross national boundaries with relative ease compared to other domains, reflecting trends of growing international collaboration in science, and a corresponding internationalisation of the profession [59,60]. This context was conducive to international policy transfer, particularly from the United States where appropriate models exist.

What factors constrain or facilitate policy transfer? In the policy transfer literature factors such as similar past policies, ideology or wider convergent forces are seen to facilitate policy change [53,55]. There are a number of contextual drivers affecting policy convergence in the university/health sectors. Firstly, science is more market oriented, with some identifying a shift from "Mode 1" knowledge production (a search for a "higher truth"), to "Mode 2" knowledge production where good science is that which responds to economic and social needs [61]. Secondly, the exponential growth in biomedical research and the requirement for value for money from publically funded studies all drive an interest in the "translation" of research and therefore potential policy approaches to facilitate it.

In England, the Cooksey review [15] characterised this process as a "translational pathway" which has two gaps—the first gap (T1) relates to the translation of basic research into ideas, treatments and products, and the second gap (T2) arises when introducing those ideas into clinical practice. In light of the Cooksey report, and other subsequent policy statements [57,58], numerous translational research policy initiatives have been introduced which aim to bridge one or both gaps [2,62]. The accreditation of AHSCs was one such early initiative designed mainly to span the first translational gap and to mobilise knowledge from academia to clinical care.

Possible constraints to policy transfer may include previous policy directions, policy complexity and local or national contextual factors. While the concept of AHSCs found a receptive context in England, the nature of the adoption of the policy reflected a particular English context. Whereas in other countries AHSCs were self-designated and self-formed, the process in England was a top down one, and the designation of AHSCs by an international panel reflects the centralised nature of English health policy.

Furthermore, at the time of accreditation, the health sector in England was in a period of sustained investment, which enabled an emphasis on quality improvement in the NHS and consequently a conducive environment for the development of AHSC partnerships. However, in common with many other countries, the subsequent economic downturn led to a period of stagnant or reduced funding for the health and university sectors. This has reinforced the importance of AHSCs developing appropriate business cases to sustain the argument for continued public investment. A new government elected in 2010 has reemphasised that AHSCs are important drivers for the UK economy and the importance of the "growth" agenda has been explicitly stated in recent policy documents [58].

Our brief review of English AHSC development through a policy transfer lens has highlighted some relevant policy questions for countries looking to pursue a similar model. We now use this and our scoping review to suggest a future research agenda in an area which has been traditionally under theorised at a policy and organisational level.

5. Discussion—a policy research agenda for AHSCs

The themes outlined in our scoping review indicate common AHSC organisational and policy issues, yet as we identified there is a lack of social science literature addressing them. In this section we review these themes and suggest three potential literatures which may contribute to addressing this gap. Firstly, we draw on our findings from the English case and policy transfer literature to highlight key research questions on how AHSC policy is developed, nationally or internationally. Secondly, we consider the relationships between professionals and managers in AHSCs. Thirdly, we address the second theme of our review, that of tensions created by the tripartite missions of AHSCs, by suggesting boundary theory as an analytical framework.

5.1. Policy transfer and epistemic communities

A key question emerging from our examination of the English case is to what extent are the structures and processes in AHSCs drawn from international models perceived as successful, or shaped by national policy contexts?

As we have demonstrated, policy transfer provides a useful analytical framework to examine this question [63]. Studies of health policy have proved illuminating for the framework [63]; yet where AHSC policy may particularly contribute is to the "who transfers policy" question.

Our case emphasises the role of "epistemic communities" of academics who hold senior positions within AHSCs and operate in international scientific networks. Our understanding of AHSC epistemic communities is particularly influenced by the use of the term in International Relations (IR) [64] and Science and Technology Studies (STS) [65]. In IR, epistemic communities are generally called on by states to provide guidance in areas of uncertainty, and gain their power from control over knowledge and information [62]. Science policy also remains an area where national governments defer broadly to "experts" and institutionalise expertise into civil service structures (such as the Chief Scientific Officer in England) [66].

In STS, epistemic communities conceptualise how different scientific disciplines make knowledge [67]. These communities often operate in global networks and involve collaborations that do not respect national boundaries [65]. Further exploration of AHSC policy and the conditions under which these epistemic communities develop and operate may help inform our understanding of policy transfer processes in this area, and in particular the role of these networks on national policy, funding and the delivery of the translational research mission. For example, although the epistemic community involved in developing English AHSCs drew on North American models [68], the case reflects a typically English centralised approach to health policy making, in that AHSCs were formally accredited through a top down process. This is in contrast to other countries where the AHSC label is largely self-adopted, albeit with national policy support. Comparative studies of AHSCs and AHSC policy development in different countries, and to what extent epistemic scientific communities can shape the policy context and the organisations themselves may provide further insight into policy transfer processes.

5.2. Professional and managerial relations

Our scoping review highlights concerns about external challenges to AHSCs (theme one), and the appropriate organisational structures (theme two) and management challenges (theme four) of these partnerships. Within these themes, much of the anecdotal literature exploring US AHSCs implicitly or explicitly refers to the tensions between healthcare professionals and managers, where AHSC professionals often question the sense and logic of managerialism [65]. This phenomenon has also been widely considered theoretically in other professional and healthcare settings [69], and could therefore usefully be applied to aid our understanding of AHSCs and appropriate policy responses.

A key research question emerging from the descriptive cases is the extent to which powerful professional groups can prevent/manipulate managerialist changes within bureaucratic organisations. In one of the few theoretically informed papers on AHSCs, Kitchener [24] considers the merger of Stanford University and University of California, which failed within a year. This paper, although primarily a consideration of the failed merger between two healthcare organisations, also informs us about the professional and managerial tensions at the core of AHSCs. In this case, the initial cost savings projected by management consultants appeared to be over optimistic and the new merged organisation was not successful in generating increased referrals.

Kitchener presents the case in an institutionalist framing and as a contest between a historically dominant professional bureaucracy and a challenging logic of market managerialism. It appears from the case that a semi-submerged but still powerful professional core managed to insulate the key elements of the AHSC (research and teaching) successfully from the merger process. This core then acted to reject the merger myth being over sold by a challenging managerial coalition and policy field [24].

In contrast, in England, senior clinical academics have been at the forefront in developing policy for and shaping AHSC partnerships which continue to hang together. The same senior clinical academics continue to hold leadership roles in these organisations and may provide stability and drive which enables the models to continue to survive. It is therefore possible that English cases have a different rationale and greater clinical and academic legitimacy. Comparative analysis of these settings, particularly across countries, may help inform our understanding of the role of professionals and managers in forming policy on AHSCs and the wider translational research agenda.

5.3. Organisational and policy boundaries

The second theme highlighted by our scoping review reflects the "mission tensions" faced by AHSCs when trying to pursue research, educational and clinical goals. These mission tensions stem from both the wide range of roles, cultures and identities within the clinical professions and associated sciences that AHSC partnerships attempt to bring together, and also from the regulatory frameworks that these partnerships are part of within their respective countries. The boundaries between these groups are multiple and various, inter-and intra-professional, inter and intra-organisational and often geographical. There is a wide literature which demonstrates how the transfer of information and knowledge between these domains can be problematic [70,71] and we therefore suggest it may be useful to study these boundaries in relation to AHSCs.

For example, one of the most critical boundaries in terms of knowledge translation within an AHSC is that between research and clinical practice. This can be characterised in several ways, including as an epistemic boundary (different ways of knowing exist in research and clinical practice) [67], a professional boundary (basic and clinical scientists distinguish themselves from practising clinicians) [72], or as an organisational boundary (between healthcare providers and research organisations) [73]. However a boundary is defined, boundary "work" is essential in attempting to translate knowledge between these domains. This can take a variety of forms, including the

use of boundary objects [74,75], and the roles of boundary spanners, for example clinical scientists, who take care of a specific boundary over time [59].

The establishment of AHSCs can be seen as a policy solution to knowledge translation across the research and clinical boundary, with the aim of drawing the issues together in a partnership setting and using organisational and team level responses to overcome barriers. For example, English AHSC responses included formalising "Joint Research Offices" which aim to minimise obstacles to obtaining required approvals for research taking place in NHS trusts. However, policy level responses may also be needed to tackle these mission tensions. As we have demonstrated, AHSCs are influenced by the regulatory and policy environments in which they are situated. In England, AHSCs are shaped by central government policies undertaken by separate departments. This can lead to competing financial and regulatory priorities in AHSCs. Policy makers may therefore be able to reduce some of those mission tensions by aligning funding streams and competing incentives between healthcare and research. This is being pursued, in some instances, through national funders, such as the National Institute for Health Research in England. Further research into boundaries and boundary work at a policy and organisational level (and interaction between the two) may help us understand how translational research operates.

Our paper has some limitations. The scope of the review was purposely broad to scan the range of literature on AHSCs, but some areas of literature may have been passed over. We mitigated this by ensuring that appropriate journals were hand searched. Secondly, the themes were generated using an inductive approach, and are overlapping. However, we believe the themes hold true in broad terms, and the gaps we highlight in the literature overall remain appropriate. Furthermore the definition of AHSCs is subjective and dependent on contextual factors, but we see them as a new organisational form developing internationally and therefore theoretically important and interesting to study. We also acknowledge that presenting a single policy case example of England may not reflect the variety of AHSC developments in other countries, but it allows us to present some policy questions which could be considered through other international examples.

6. Conclusion

This paper has reviewed the wide variety of literature published on AHSCs. The gaps in this literature from a social science perspective are a lack of theory development or empirical research on the organisational and policy aspects of AHSCs as they work towards their tripartite missions of research, education and patient care. Furthermore, the literature is dominated by organisational level single site descriptive cases. We have contributed to addressing this gap by using a policy transfer framework to consider the case example of England.

Pointing towards a future research agenda on AHSCs and policy frameworks surrounding them, we have drawn on three useful literatures (policy transfer and epistemic communities, professional/managerial relations and boundaries). These three literatures have a key feature in common—the importance of professional and managerial elites whose networks span professional, organisational and national boundaries. We suggest three AHSC research questions derived from these literatures.

Firstly, policy transfer literature on health has mainly focussed around large scale reforms [63] or specific public health initiatives [54]. Our contribution to this literature brings together both health and research policy. Future empirical studies of AHSCs could examine international policy networks and how they operate to transfer policy, and to what extent policies are still shaped by national and international structures.

Secondly, AHSC epistemic communities are of interest from a professional/managerial relations perspective. Building on previous studies of AHSCs, further research could consider what impact these communities and their international networks have on professional and managerial relations. These communities may be linked to a possible professional restratification in biomedical research and healthcare, where elites may take on managerial functions whilst simultaneously protecting their clinical academic interests.

Thirdly, using boundary theory, future research could examine how these elites may help drive translational research within university and healthcare partnerships. Clinical academic elites may act as organisational, epistemic and professional boundary spanners, and we can consider the processes through which they are able (or not) to span different boundaries within AHSCs.

Our paper has highlighted some key concerns for policy makers. Firstly, AHSCs are particularly complex. Their multiple and varied missions, funding streams and professional groups contribute to a range of competing priorities within the organisations. Policy makers in education, healthcare and research should recognise this complexity, minimise competing policy positions and incentivise AHSCs to achieve their tripartite missions through translational funding streams and other policy levers appropriate to the national context.

Secondly, at an organisational and national level, no "one size fits all" approach can be applied to AHSCs. We have demonstrated that in North America and England a range of organisational models have developed reflecting local circumstances, and that the organisational model adopted does not necessarily determine whether or not an AHSC is successful in achieving its tripartite mission.

Thirdly, AHSCs are influenced by factors beyond national boundaries. They are international organisations. The networks in which high level medical research groups operate are international and ideas flow across these national boundaries. Policy makers should recognise this phenomenon and ensure that national policies do not restrict the scope of this knowledge flow.

As these new organisational forms and variants of them become more widely developed internationally, and more public funding is allocated to them through translational research streams, research exploring social factors within these settings may prove fruitful in developing our understanding of "how" translational research works and why it may work in some settings and not others.

Conflicts of Interest Statement

At the time of writing, CF and NF were employed by UCL, a member of the UCL Partners AHSC. EF is employed by King's College London, a member of the King's Health Partners AHSC.

Acknowledgement

CF is funded by a National Institute for Health Research Doctoral Research Fellowship. This article presents independent research funded by the National Institute for Health Research. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health. We thank Angus Ramsay, Simon Turner and the reviewer for their helpful comments on our paper.

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